



Earth Science Technology Office

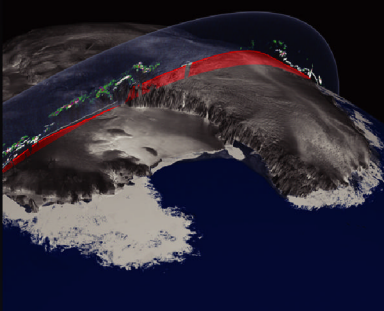
LASER RISK REDUCTION PROGRAM (LRRP)

Laser / Lidar remote sensing techniques can satisfy a variety of measurement and operational requirements. The Laser Risk Reduction Program was established in 2002 by the Earth Science Technology Office (ESTO) in order to formalize design, testing, and development procedures for durable laser systems and architectures, particularly in the critical 1- and 2-micron wavelengths. In doing so, LRRP aims to demonstrate laser technologies that can be reliably and confidently applied to a wide range of missions.

Future Applications for Laser Technology

Earth Science

- ❖ Clouds / Aerosols
- ❖ Tropospheric Winds
- ❖ Ozone
- ❖ Carbon Dioxide
- ❖ Biomass
- ❖ Water Vapor
- ❖ Surface Mapping
- ❖ Laser Altimetry



Exploration

- ❖ Lander Guidance / Control
- ❖ Atmospheric Winds
- ❖ Biochemical Identification
- ❖ Optical Communication
- ❖ Automated Rendezvous and Docking



Space Science

- ❖ Surface Materials
- ❖ Physical State
- ❖ Surface Topography
- ❖ Molecular Species
- ❖ Atmospheric Composition and Dynamics



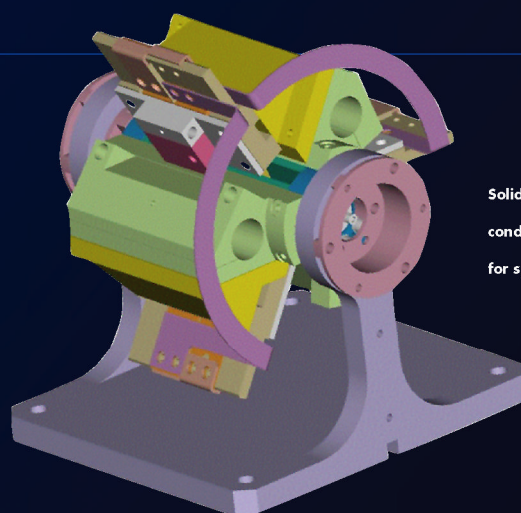
Aeronautics

- ❖ Turbulence Detection
- ❖ Wind Shear Detection
- ❖ Wake Vortices



Investment Areas

- ❖ High-performance 1- and 2- Micron Lasers
- ❖ High-reliability Pump Laser Diode Arrays
- ❖ Space Radiation Tolerance
- ❖ Frequency Control and Wavelength Conversion
- ❖ Electrical Efficiency
- ❖ Heat Removal and Thermal Management
- ❖ Contamination Tolerance
- ❖ Photoreceiver and detector Development



Solid model of a high energy, high efficiency, conductively-cooled solid-state 2-micron laser for space lidar applications

Acknowledgments

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AdvR Applied Photonics
American University
Boston College
Coherent, Inc.
Genesis Engineering
ITT Industries

Johns Hopkins University, Applied Physics Lab
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